

# MODELING UPDATE

*Justin Crow, MPA*



**BIOCOMPLEXITY INSTITUTE**



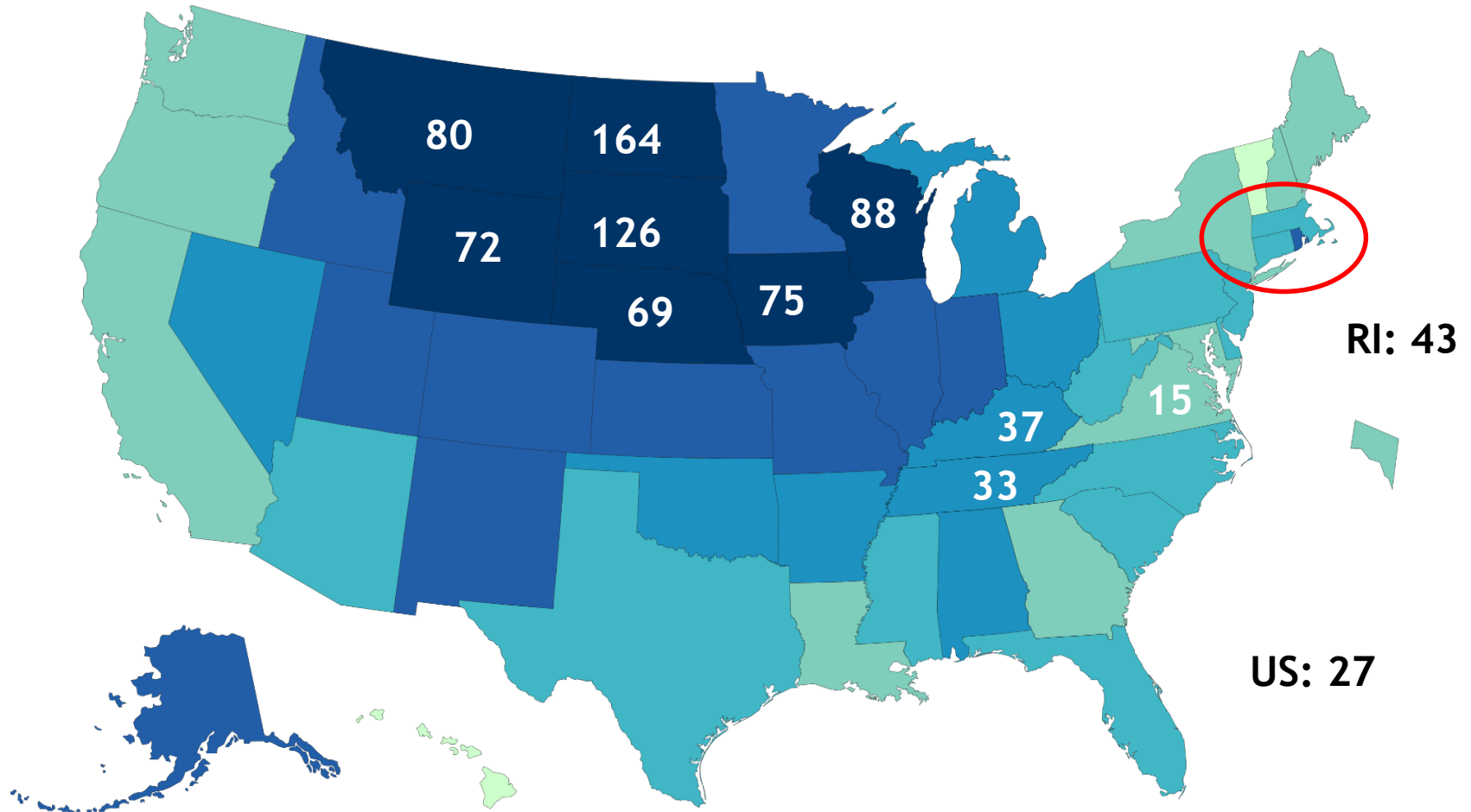
*To protect the health and promote the well-being of all people in Virginia.*

# UVA COVID-19 Model-Background

- Model is developed by the UVA Biocomplexity Institute
- Model has evolved
  - Current methodology: “Adaptive Fitting”
  - Based on observed cases in each health district
  - Responsive to current trends → week-to-week volatility
- Models thrive on more & better data, and the model improves every week.
- Behavioral and policy responses drive changes in current trends

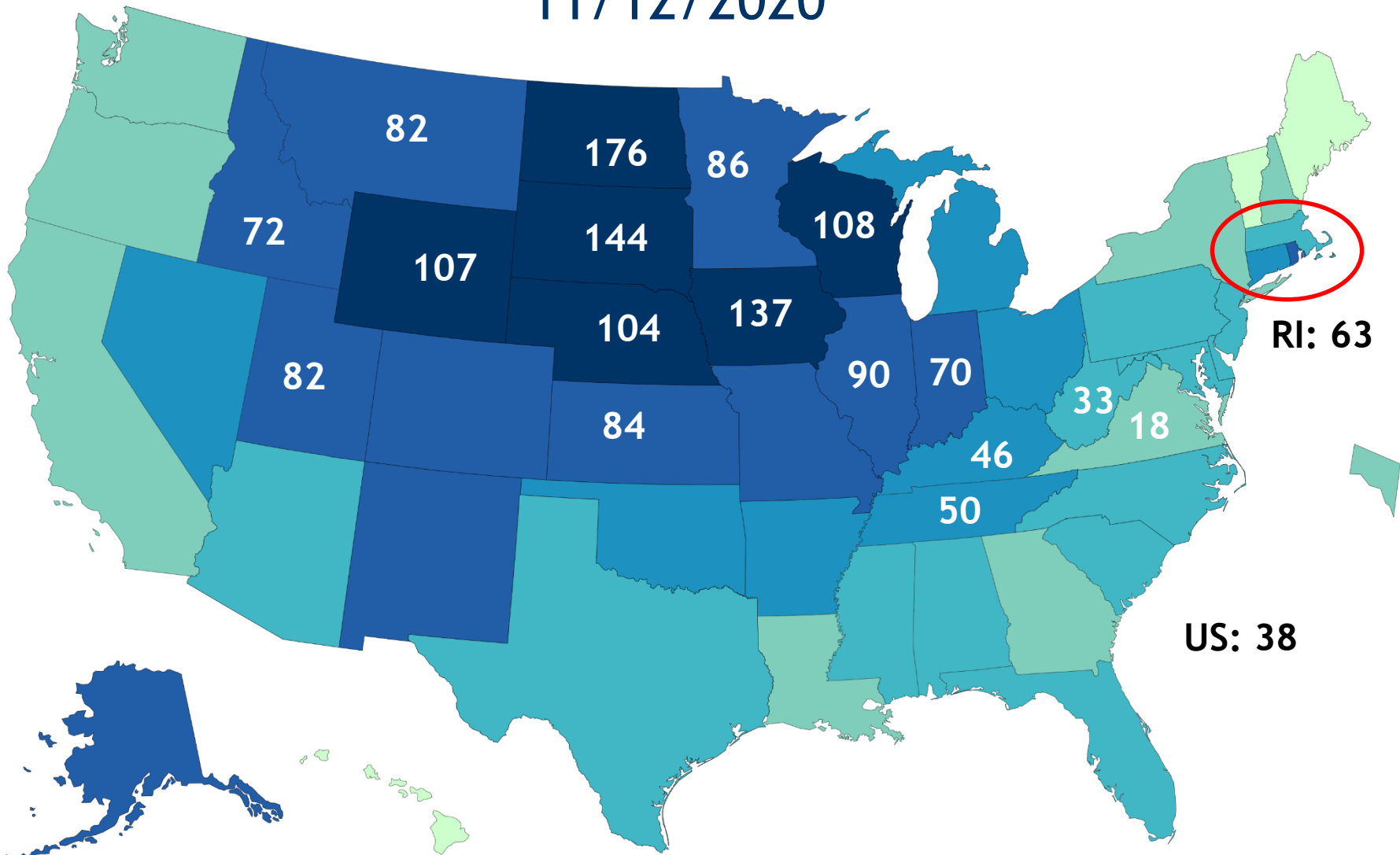
# Weekly Cases per 100k Residents

## 11/05/2020



[https://covid.cdc.gov/covid-data-tracker/#cases\\_casesinlast7days](https://covid.cdc.gov/covid-data-tracker/#cases_casesinlast7days)

# Weekly Cases per 100k Residents 11/12/2020



[https://covid.cdc.gov/covid-data-tracker/#cases\\_casesinlast7days](https://covid.cdc.gov/covid-data-tracker/#cases_casesinlast7days)

## Case rate trends in neighboring states have grown

Over the last 7 days, Virginia had 17.2 (+12% from last week) new confirmed cases per day per 100,000

### Very high case loads (>20):

- Tennessee (49.8 new cases per 100k, +57% from last week)
- Kentucky (42.4, Kentucky +12%)
- West Virginia (29.7, +24%)
- North Carolina (25.6, +64%)
- Maryland (21.1, +46%)

### High case loads (10-20):

- District of Columbia (13.1, +3%)

Lower case loads (<10): None

These data were updated November 12<sup>th</sup> and represent a seven-day average of the previous week

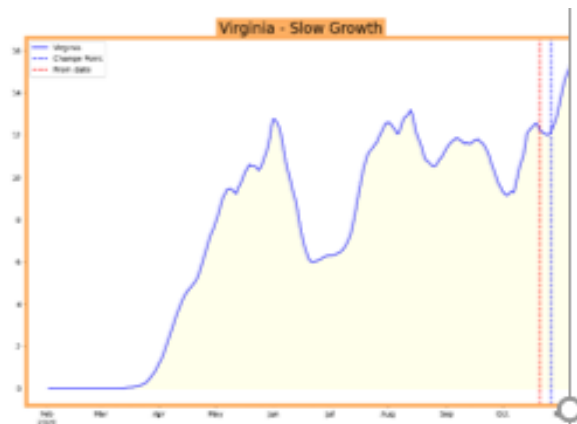
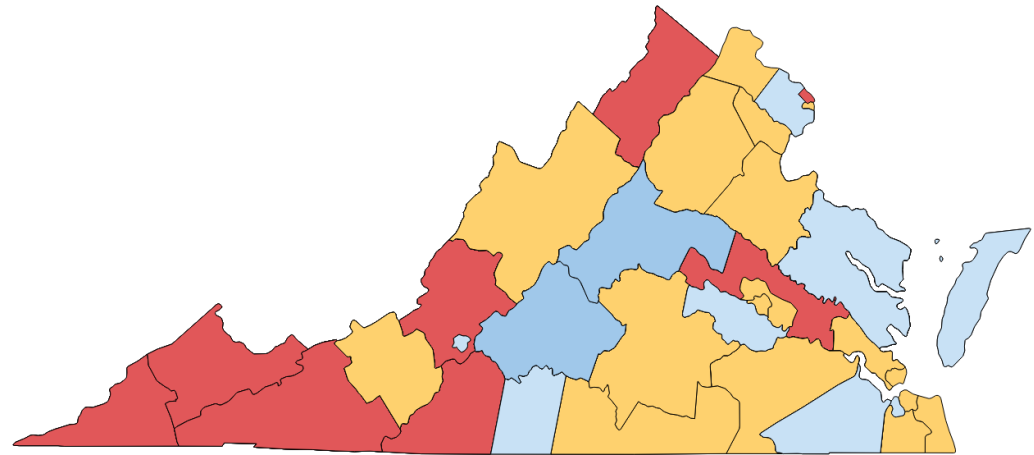
# Weekly Cases per 100k Residents



These data were updated November 10<sup>th</sup> and represent a seven-day average of the previous week

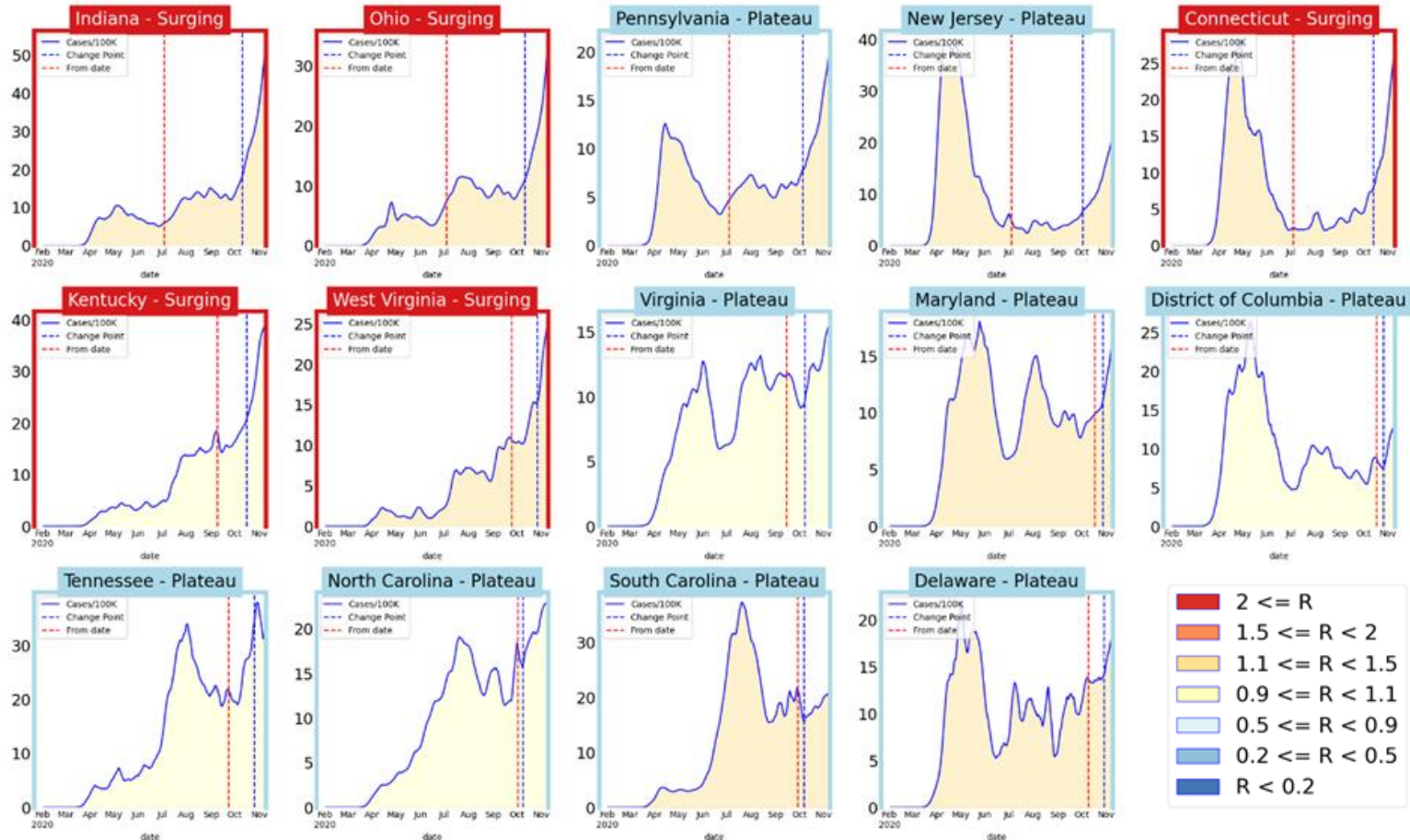
# Health Districts in Surge

Status	# Districts (last week)
Declining	2 (5)
Plateau	8 (10)
Slow Growth	17 (17)
In Surge	8 (3)



Trajectory	Description	Weekly Case Rate (per 100K) bounds
Declining	Sustained decreases following a recent peak	below -0.9
Plateau	Steady level with minimal trend up or down	above -0.9 and below 0.5
Slow Growth	Sustained growth not rapid enough to be considered a Surge	above 0.5 and below 2.5
In Surge	Currently experiencing sustained rapid and significant growth	2.5 or greater

# State Level Trajectories

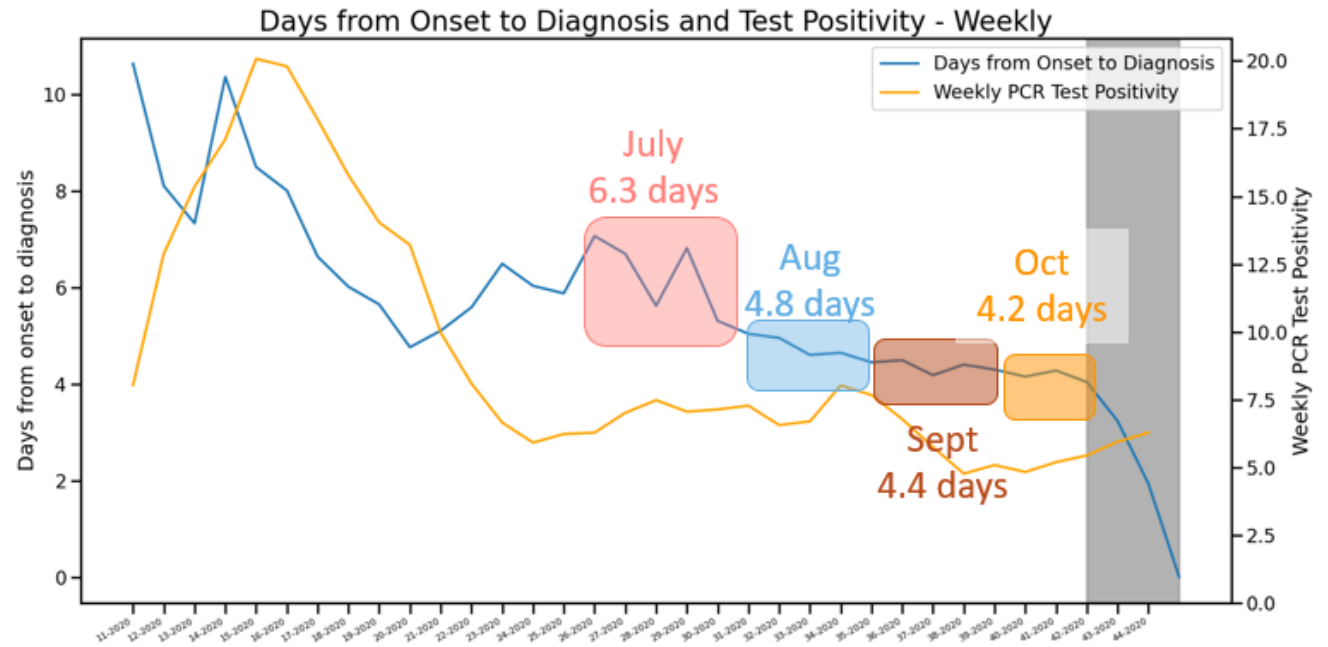


24 States in Surge Trajectories

# Changes in Case Detection - Symptom Onset to Diagnosis

## Days to Diagnosis

- April = 8.6 days
- May = 5.6 days
- June = 6.0 days
- July = 6.3 days
- August = 4.8 days
- Sept = 4.4 days
- Oct = 4.2 days
- Overall = 5.7 days

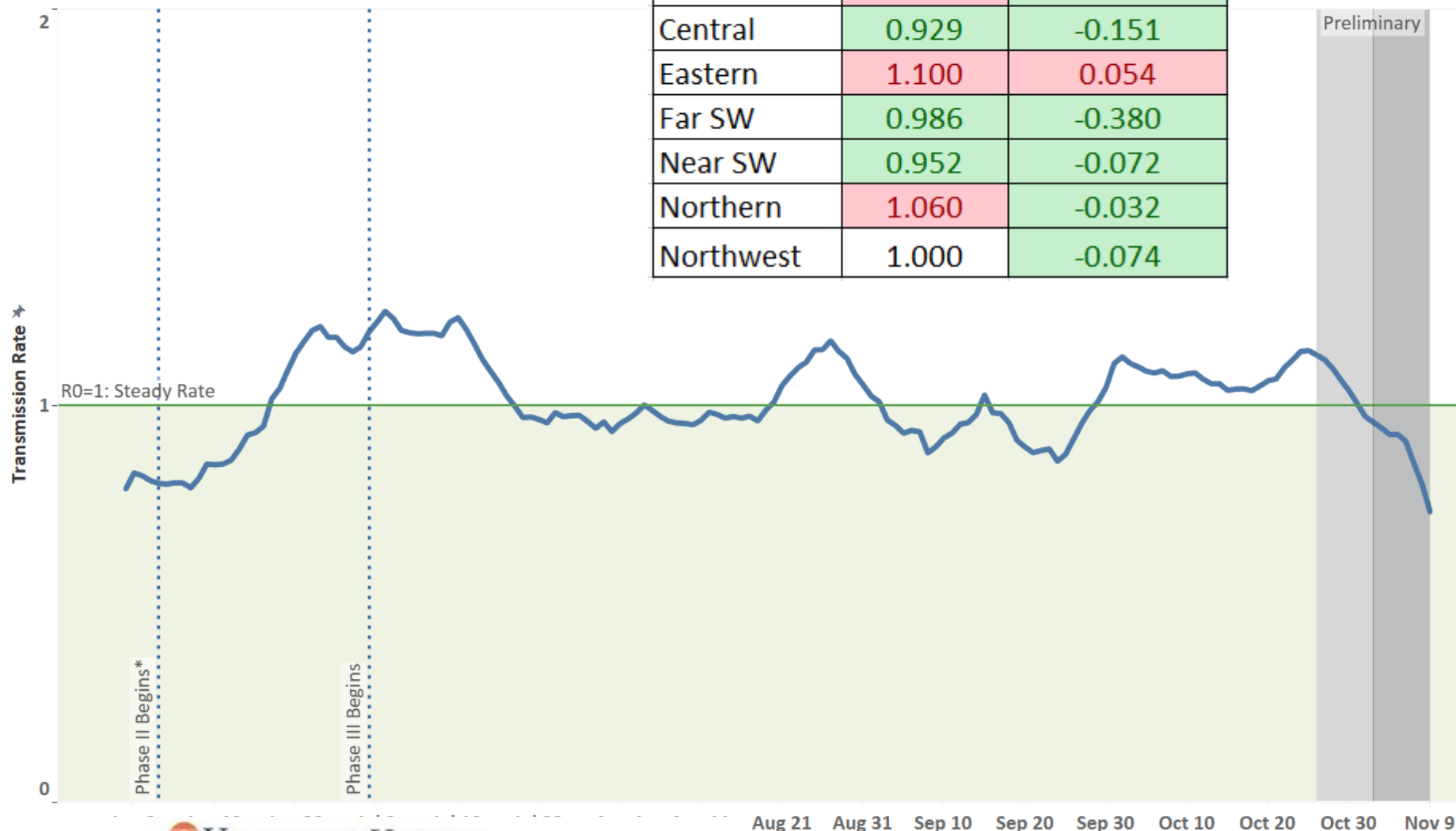


# Reproduction Rate

Reproduction Rate ( $R_0$ ): Virginia

7-day Moving Average, Updated 11/12/2020 1:54:07 PM

Region	$R_e$ Oct 31	Weekly Change
<b>State-wide</b>	<b>1.005</b>	<b>-0.082</b>
Central	0.929	-0.151
Eastern	1.100	0.054
Far SW	0.986	-0.380
Near SW	0.952	-0.072
Northern	1.060	-0.032
Northwest	1.000	-0.074



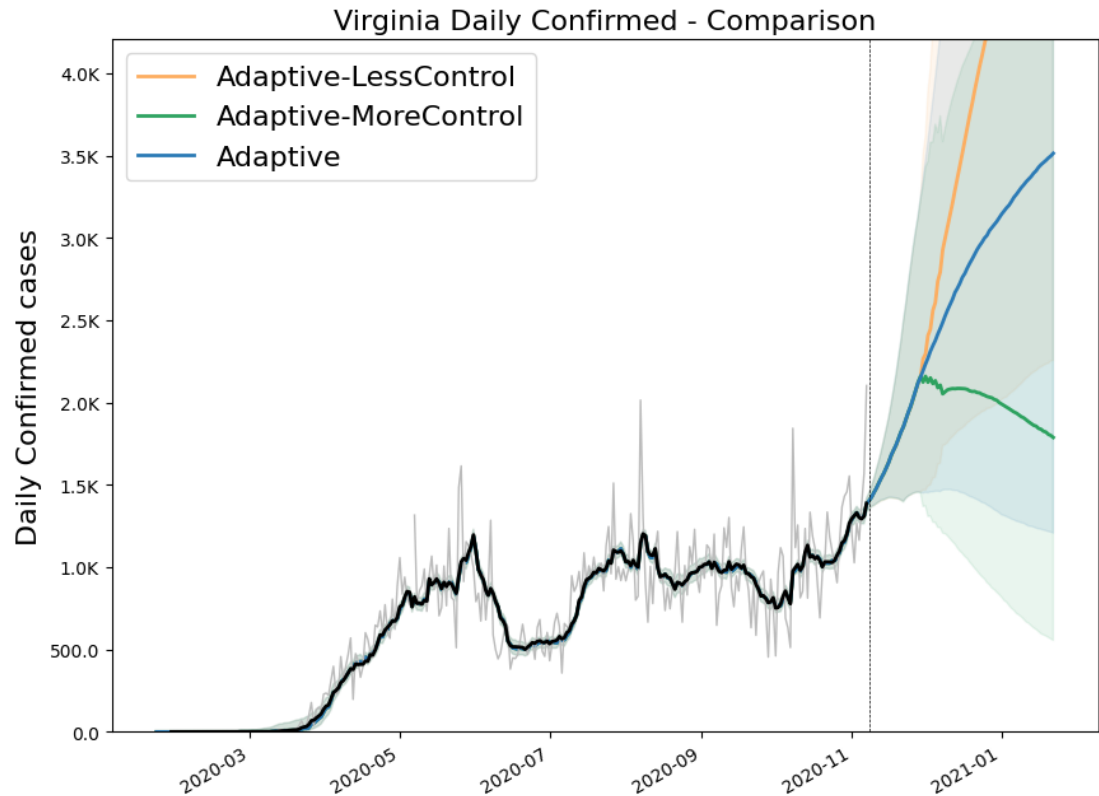
# Projections

- Current Course
  - “Adaptive fitting” approach
    - **Feb 14 (Peak): 25,500**
    - **Jan 17: 24,000**

Two “what-if” scenarios:  
transmissibility changes  
beginning on November 26

- More Control (15% decrease)
  - **Dec 6 (Peak): 15,000**
- Less Control (15% increase)
  - **Feb 14 (Peak): 47,000**
  - **Jan 17: 40,000**

## Virginia Projections

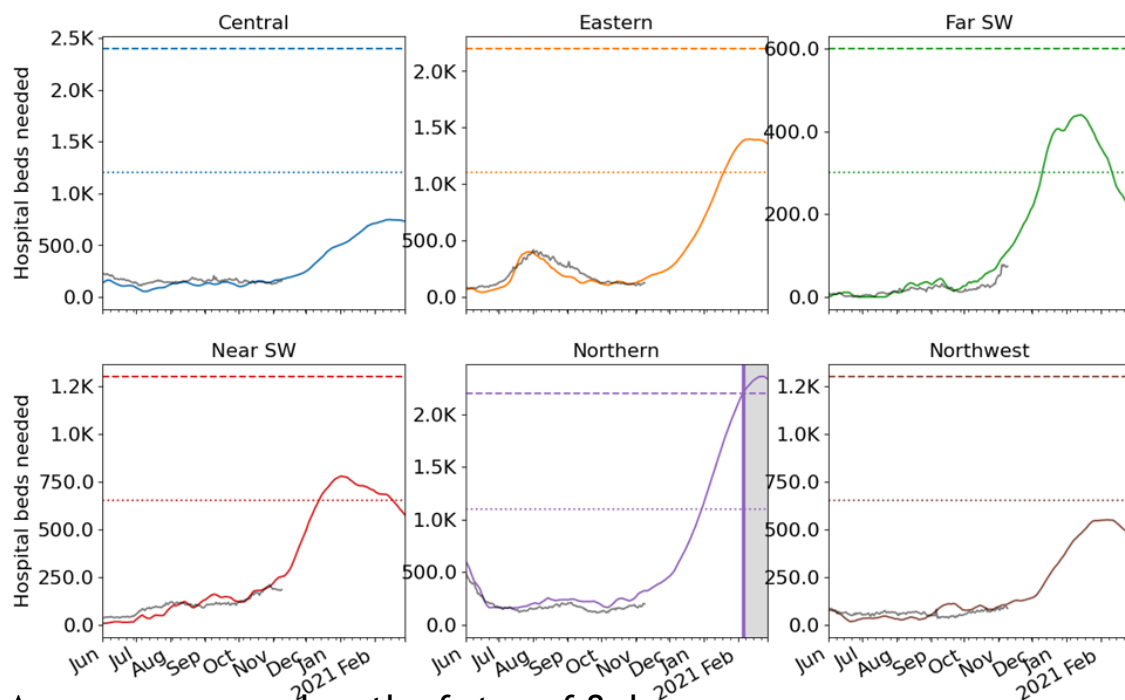


# Hospital Demand and Capacity by Region

## Capacities by Region - Adaptive-Less Control

COVID-19 capacity ranges from 80% (dots) to 120% (dash) of total beds

Scenario Adaptive-LessControl

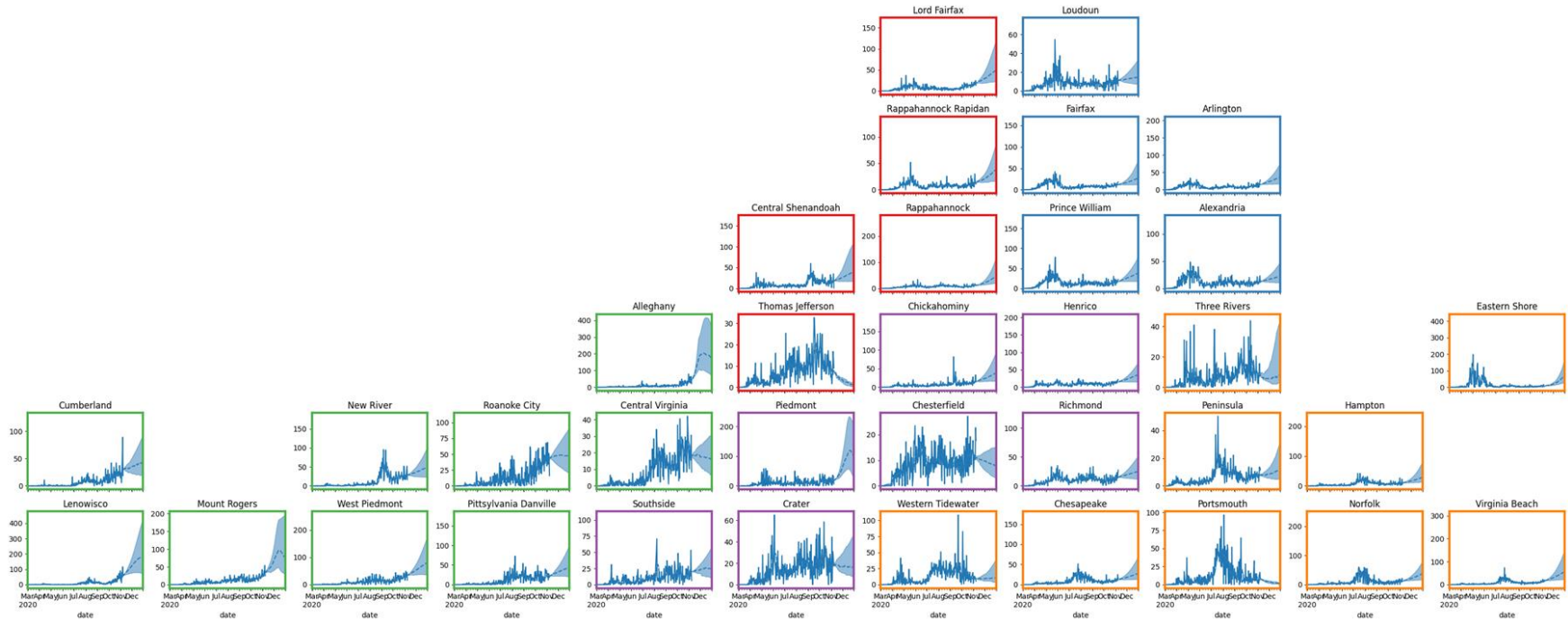


- Based on Adaptive-Less Control scenario
- Does NOT take flu season into account

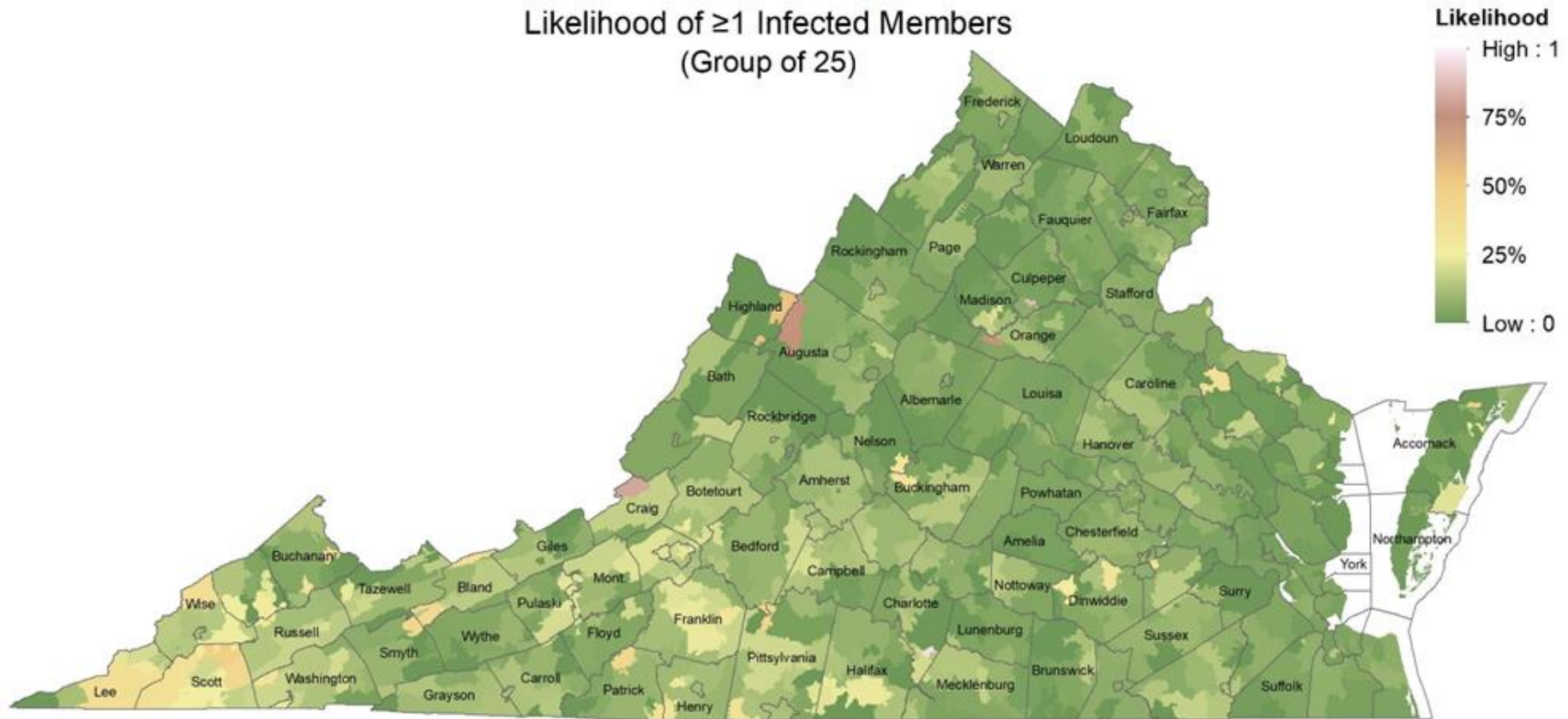
\* Assumes average length of stay of 8 days

# District Level Projections: Adaptive

Cases per 100k



# COVID-19 Presence Likelihood

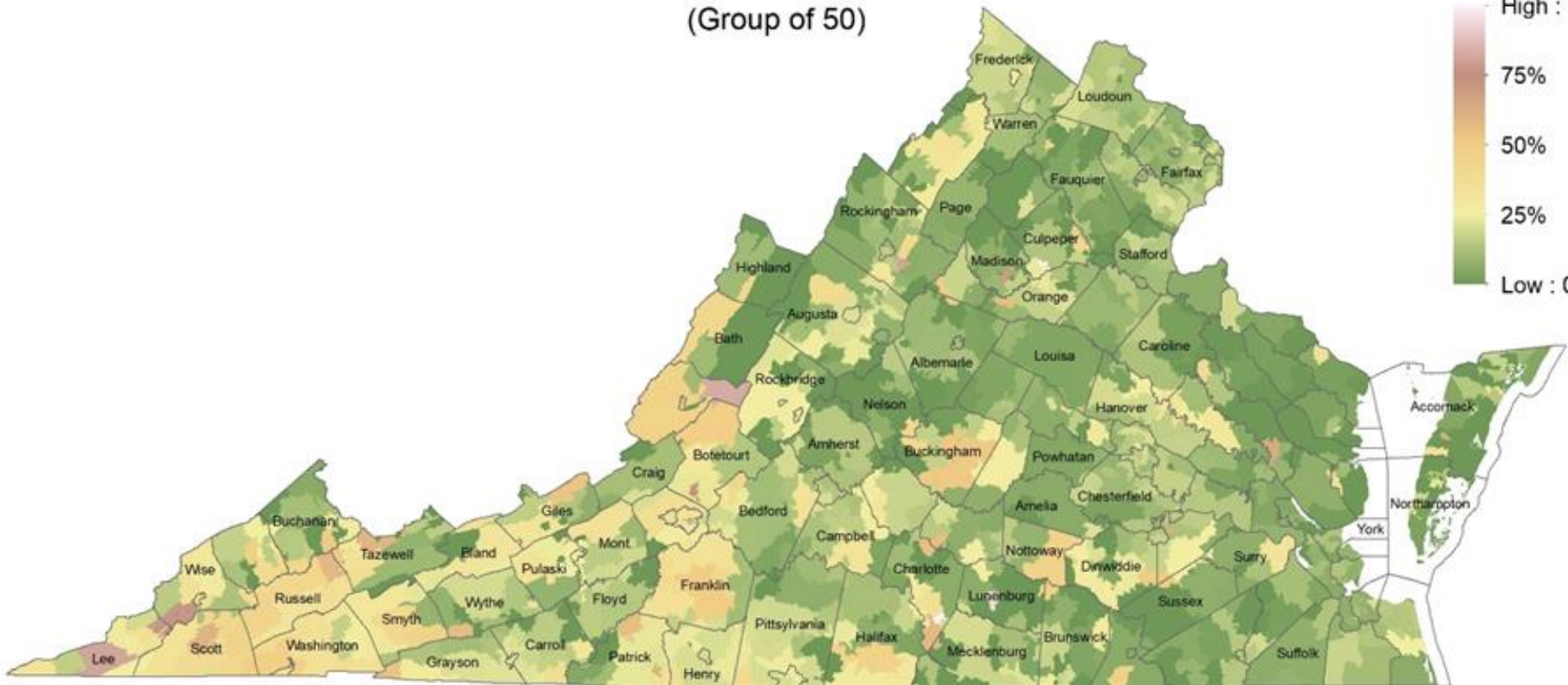


Based on zip code point prevalence for week ending 2020-11-08

# COVID-19 Presence Likelihood

Likelihood of  $\geq 1$  Infected Members  
(Group of 50)

Likelihood  
High : 1  
75%  
50%  
25%  
Low : 0



Based on zip code point prevalence for week ending 2020-11-08



# There are interventions that could be applied to mitigate Thanksgiving spread

## **Research and data indicate that the 18- to 29-year-old population can be a major source of spread**

- Research has found that this population was instrumental in the early spread of COVID in the U.S.
- Studies also indicate that cases in this population peak two- to four-weeks before other age groups during many county-level outbreaks

## **Targeting the 18- to 29-year-old population may be an efficient way to reduce the spread**

- Testing should be greatly expanded for this population prior to Thanksgiving
- Colleges and universities with elevated case levels should consider remaining open during Thanksgiving for students that have been exposed to COVID to reduce spread off-campus

## **There are also broader policy responses that could be applied**

- Mandatory testing at airports and other transit points could reduce the spread from out-of-state travelers
- A shutdown of at least two weeks paired with expanded testing in mid-November could reduce levels prior to Thanksgiving
- Alternatively, targeted shutdowns may be useful and more widely accepted
- A short shutdown may be a useful mitigation after Thanksgiving to contain spread prior to the December holidays

# Where to find modeling results

- **VDH COVID-19 Data Insights**  
<https://www.vdh.virginia.gov/coronavirus/covid-19-data-insights/>
  - Model Explorer (Wed)
  - UVA Biocomplexity Institute Slides (Fri)
  - RAND Slides (Fri)
  - Weekly Update (Fri)
- **COVID-19 Medical Resource Demand Dashboard**  
<https://covid19.biocomplexity.virginia.edu/dashboards>
  - Hospital Capacity Scenarios
- **Internal Dashboards**
  - Transmission Rates ( $R_0$ ) (Wed)  
<https://dataviz.vdh.virginia.gov/#/views/TransmissionRate/Dashboard1>
  - Google Mobility Report (Wed)  
<https://dataviz.vdh.virginia.gov/views/GoogleMobility/Dashboard1>
  - Detailed Internal Model (Wed)  
[https://dataviz.vdh.virginia.gov/views/DailyModelInternal\\_15908727184890/AllModelResults?iframeSizedToWindow=true&:embed=y&:showAppBanner=false&:display\\_count=no&:showVizHome=no](https://dataviz.vdh.virginia.gov/views/DailyModelInternal_15908727184890/AllModelResults?iframeSizedToWindow=true&:embed=y&:showAppBanner=false&:display_count=no&:showVizHome=no)